

178 13

# SERVICE MANUAL

## & PARTS LIST

(without price)

**ELECTRONIC KEYBOARD**

**EP-30**

**JAN. 1988**



EP-30

**CASIO®**

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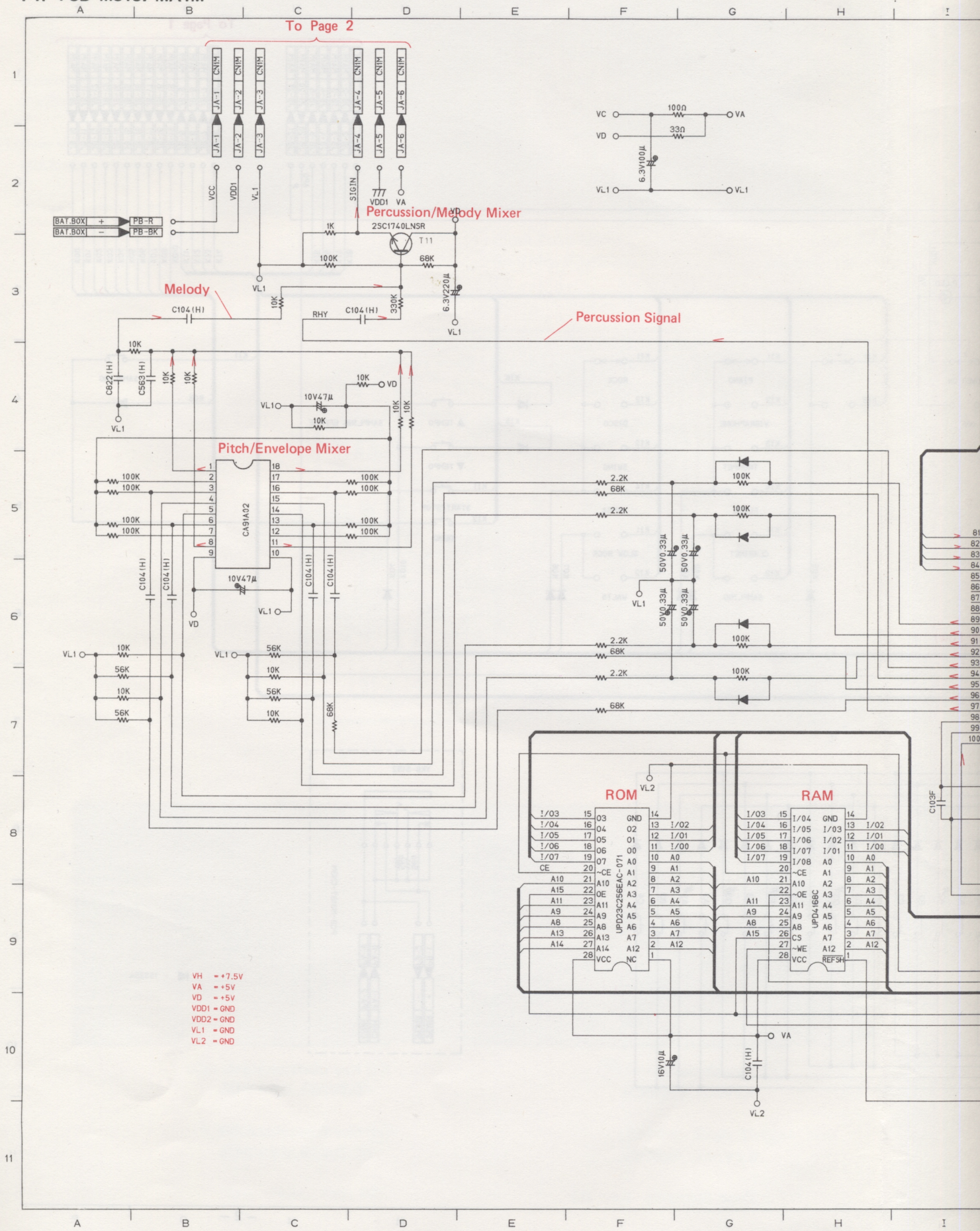
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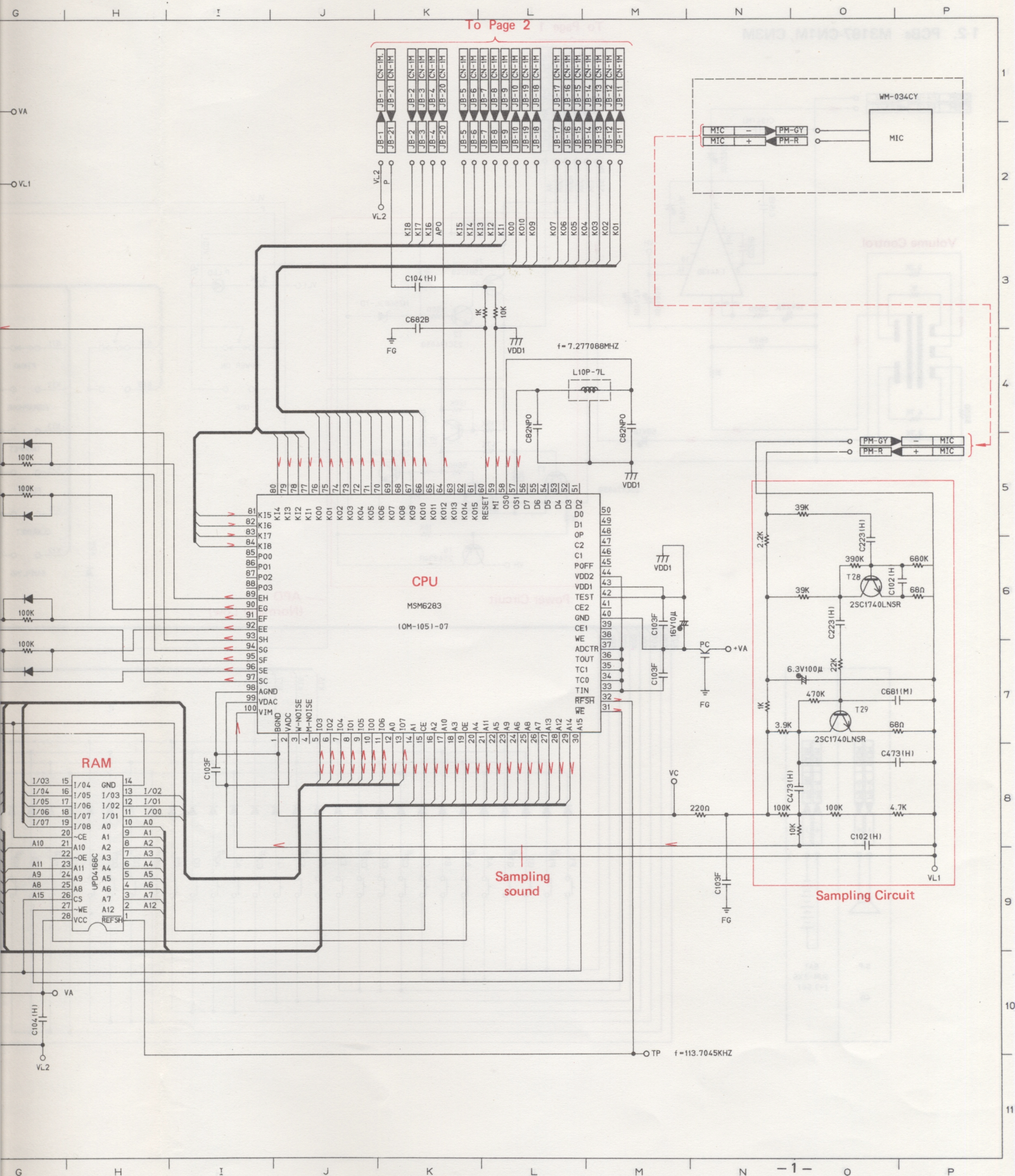


## 1. SCHEMATIC DIAGRAM

### 1-1. PCB M3187-MA1M



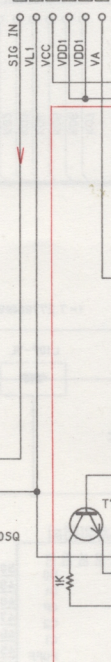
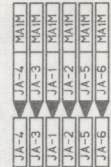
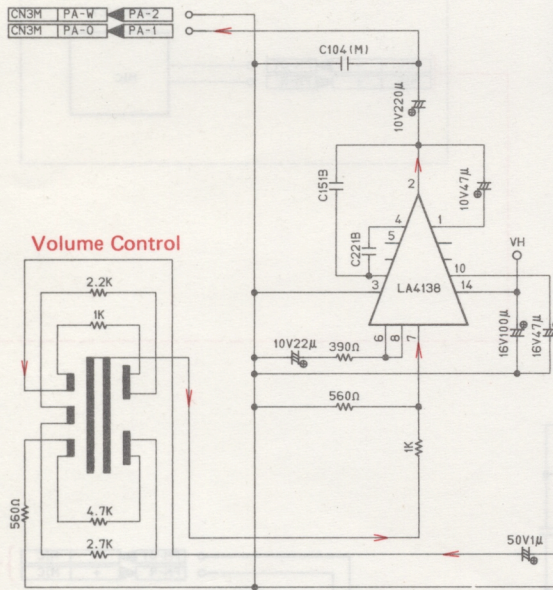






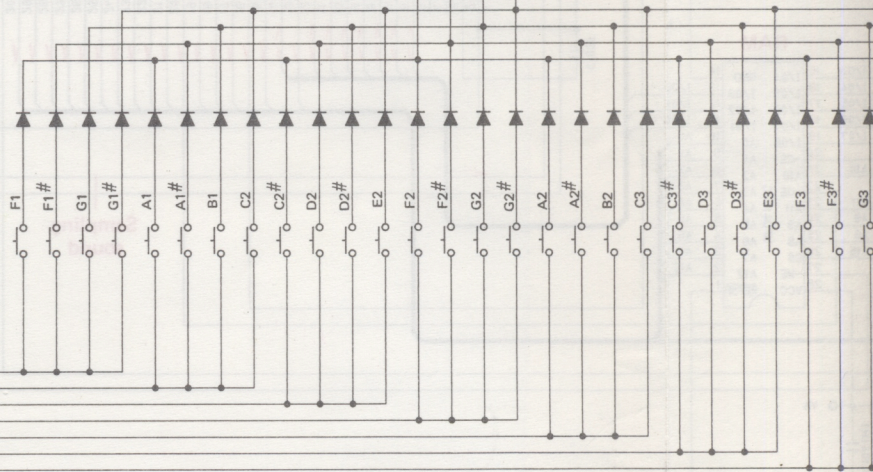
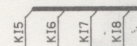
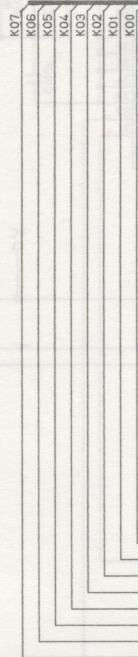
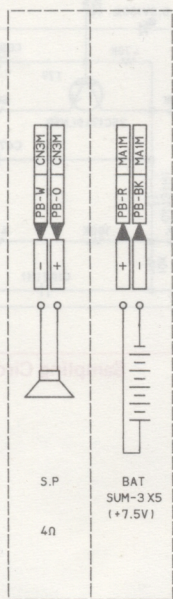
# 1-2. PCBs M3187-CN1M, CN3M

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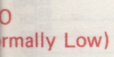


Power Circuit

APO (Normally Low)



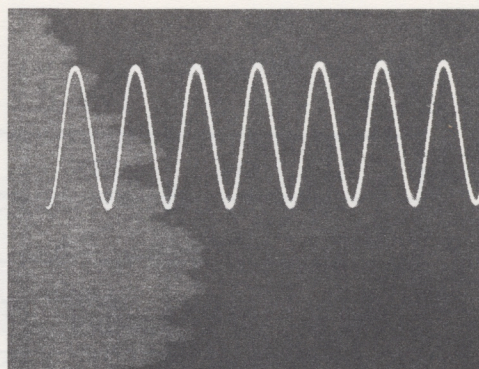




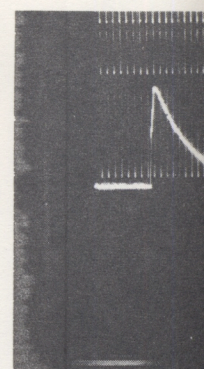


## 2. PCB VIEW & MAJOR WAVEFORMS

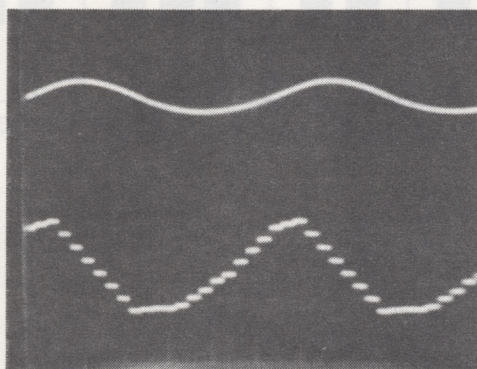
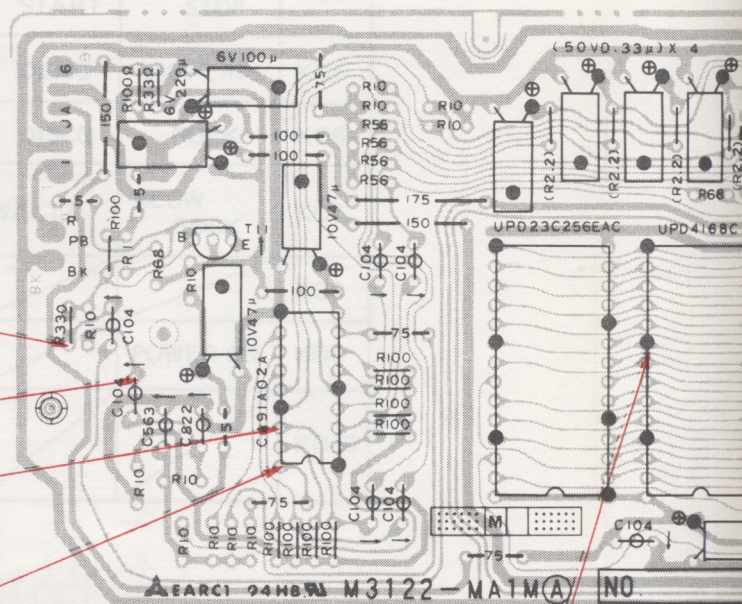
Note: Probe reduction: 10:1



① Clock Pulse Signal  
0.1V/div, 0.1μS/div



② Reset Signal  
0.2V/div, 2mS/div

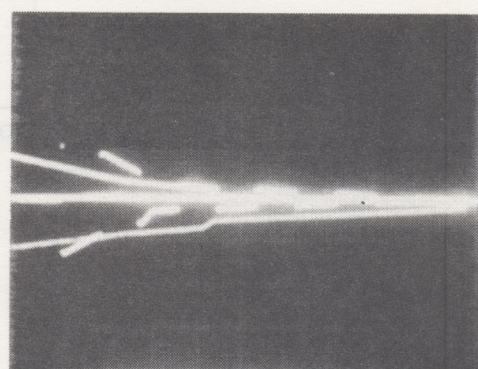


⑤ Melody signal  
20mV/div, 0.2mS/div

⑥

⑥ Mixing signal for merody  
20mV/div, 0.2mS/div

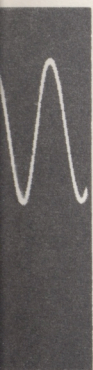
Tone: Flute, Key: A2



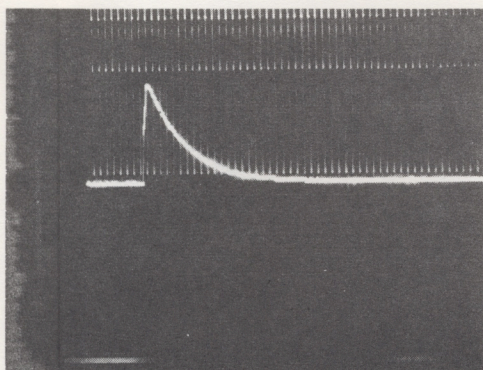
⑦ Percussion signal  
0.2V/div, 5mS/div

Rhythm: Rock, Tempo: Max.



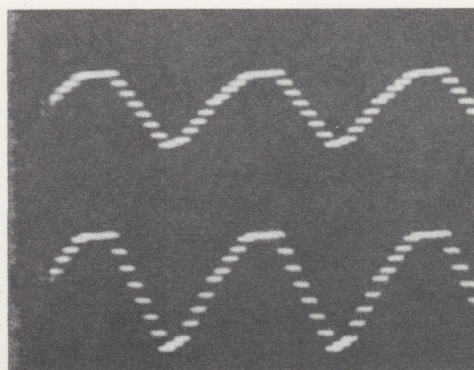


②



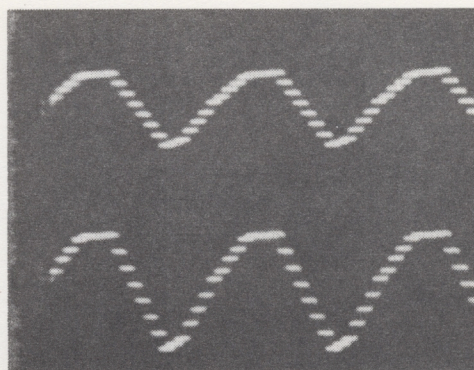
② Reset Signal  
0.2V/div, 2mS/div

③



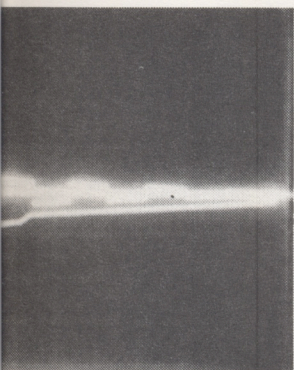
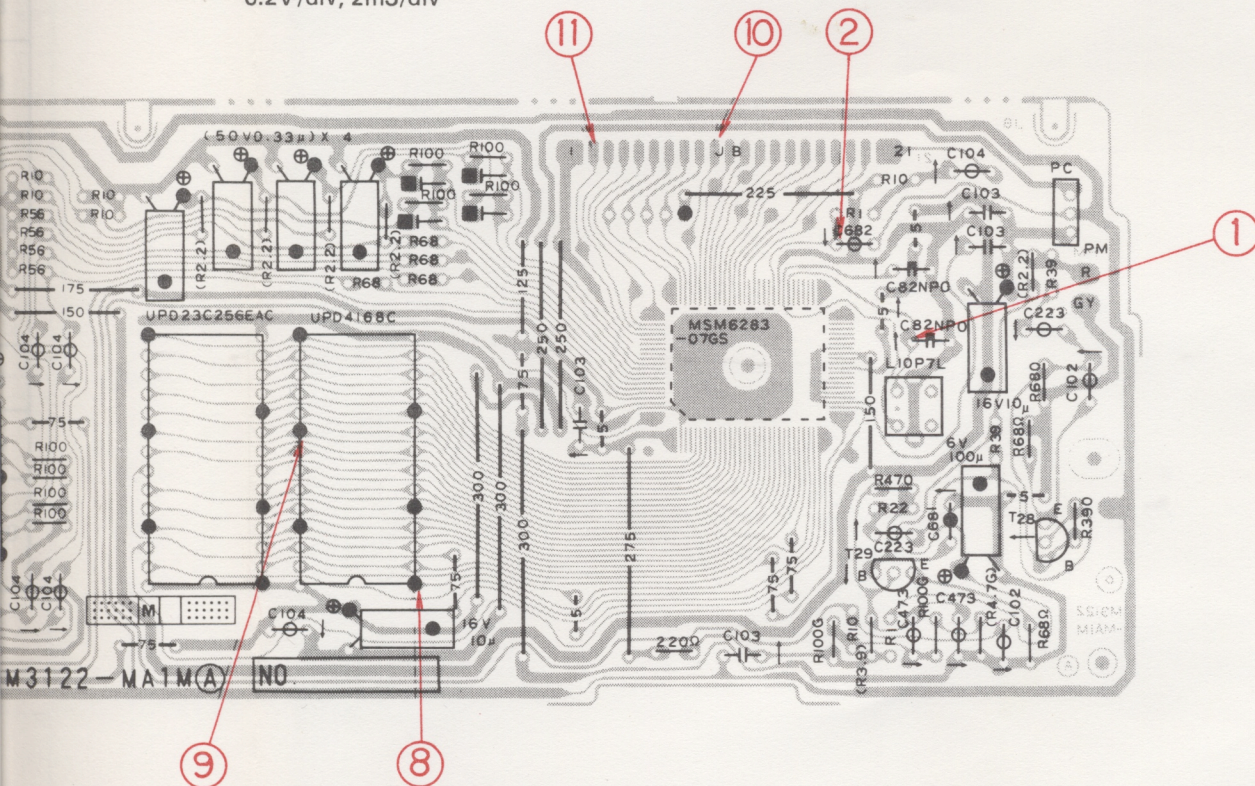
③ Pitch signal for merody  
50mV/div, 0.2mS/div

④



④ Mixing signal for merody  
50mV/div, 0.2mS/div

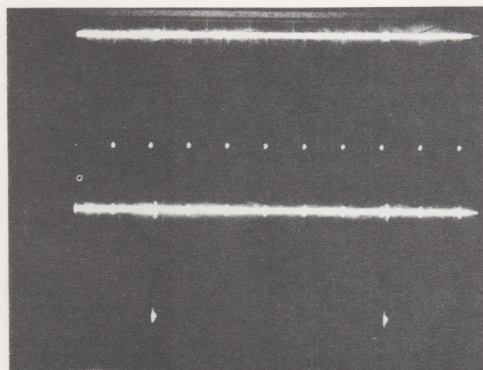
Tone: Flute, Key: A2



Signal  
mS/div

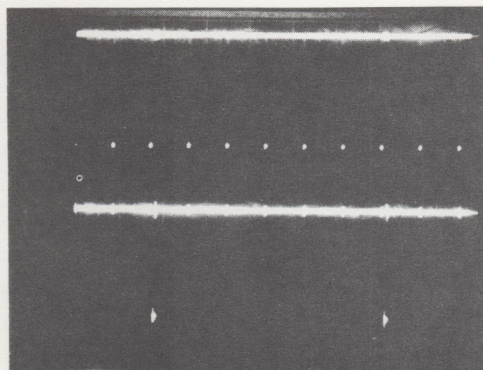
lock, Tempo: Max.

⑧



⑧ Refresh signal  
0.2V/div, 10μS/div

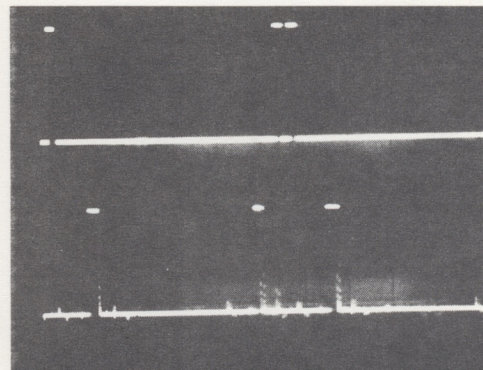
⑨



⑨ CE signal  
0.2V/div, 10μS/div

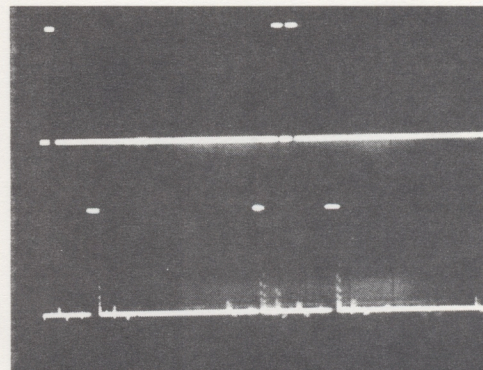
Tone: Sampling, Key: G3

⑩



⑩ Key common signal KO0  
0.2V/div, 0.5mS/div

⑪

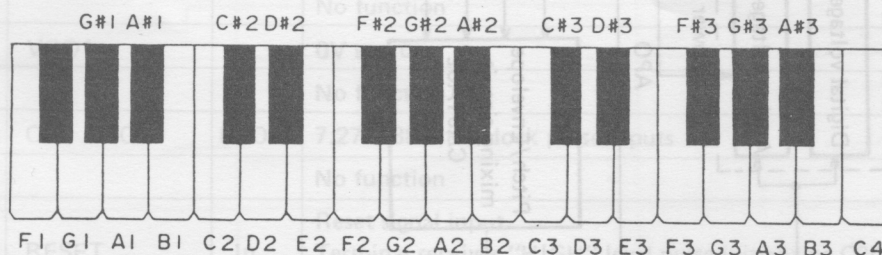


⑪ Key input signal KI8  
0.2V/div, 0.5mS/div

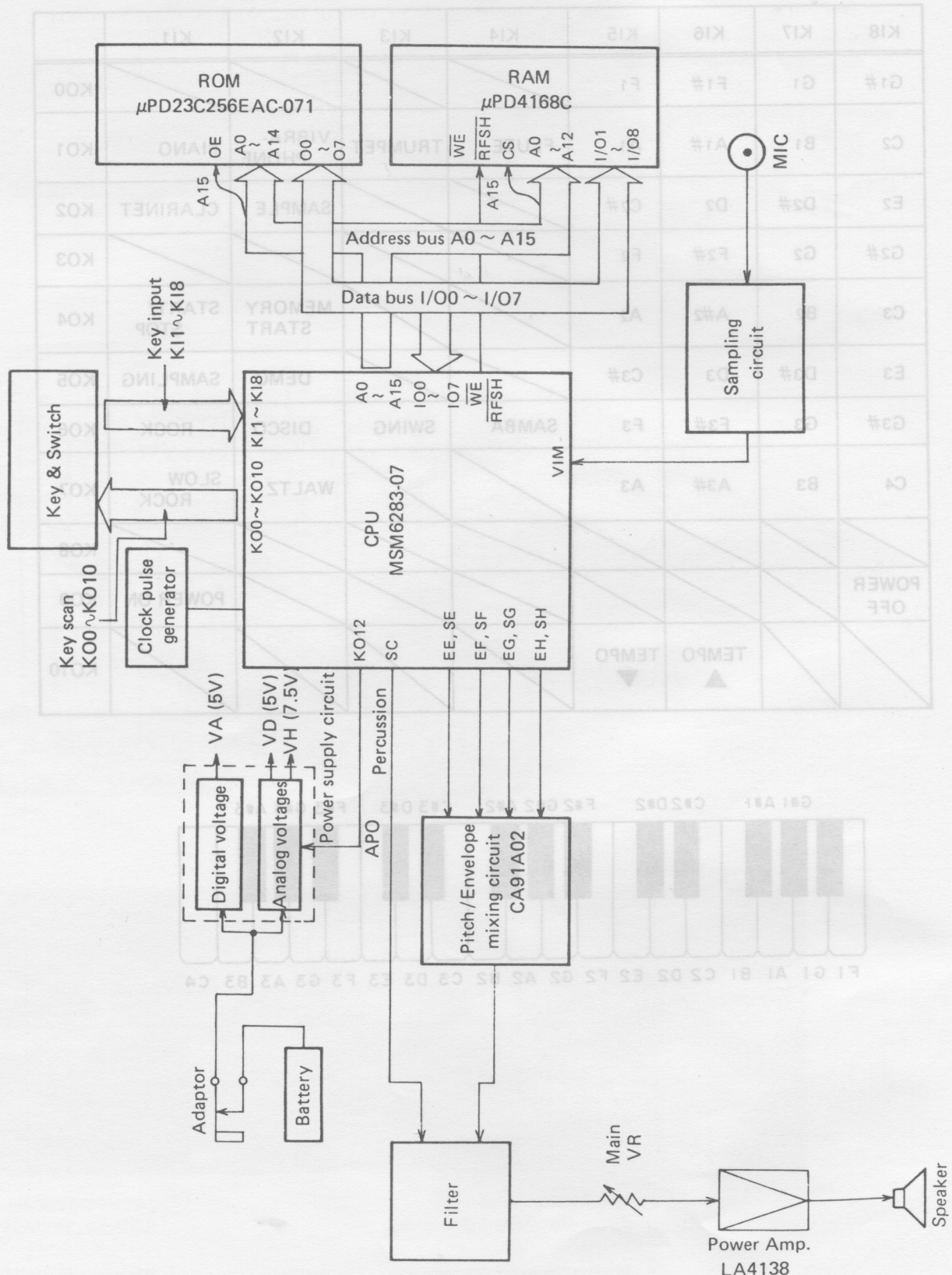


### 3. KEY MATRIX

| K18       | K17 | K16     | K15     | K14   | K13     | K12          | K11        |      |
|-----------|-----|---------|---------|-------|---------|--------------|------------|------|
| G1#       | G1  | F1#     | F1      |       |         |              |            | KO0  |
| C2        | B1  | A1#     | A1      | FLUTE | TRUMPET | VIBRA-PHONE  | PIANO      | KO1  |
| E2        | D2# | D2      | C2#     |       |         | SAMPLE       | CLARINET   | KO2  |
| G2#       | G2  | F2#     | F2      |       |         |              |            | KO3  |
| C3        | B2  | A#2     | A2      |       |         | MEMORY START | START/STOP | KO4  |
| E3        | D3# | D3      | C3#     |       |         | DEMO         | SAMPLING   | KO5  |
| G3#       | G3  | F3#     | F3      | SAMBA | SWING   | DISCO        | ROCK       | KO6  |
| C4        | B3  | A3#     | A3      |       |         | WALTZ        | SLOW ROCK  | KO7  |
|           |     |         |         |       |         |              |            | KO8  |
| POWER OFF |     |         |         |       |         |              | POWER ON   | KO9  |
|           |     | TEMPO ▲ | TEMPO ▼ |       |         |              |            | KO10 |



#### 4. BLOCK DIAGRAM





## 5. CPU (MSM6283-01GS)

- Generates pitch and envelope signals for melody, chord, bass, and obbligato sounds.
- Provides percussion sounds.
- Controls keys, switches, RAM, and ROM.

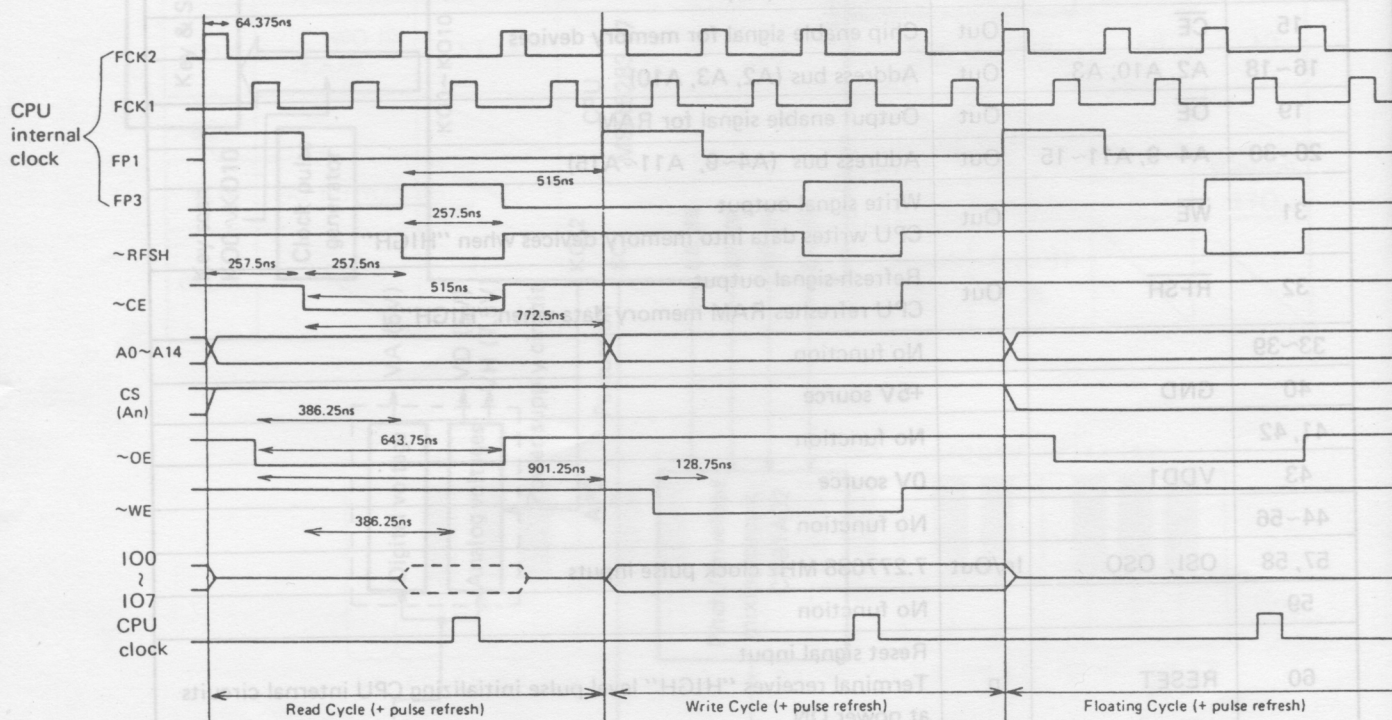
The following lists the pin functions of the CPU.

As the LSI works in negative logic, GND is +5V whereas power source is 0V.

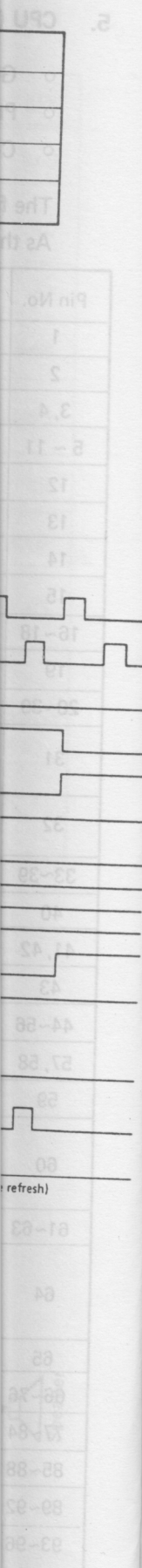
| Pin No. | Terminal Name     | In/Out | Function  |
|---------|-------------------|--------|---|
| 1       | BGND              |        | +5V source for ADC(Analog to Digital Converter)   |
| 2       | VADC              |        | Ground (0V) source for internal ADC   |
| 3, 4    |                   |        | 0V source for ADC   |
| 5 ~ 11  | IO0 ~ IO6         | In/Out | Data bus (IO0 ~ IO6)  |
| 12      | A0                | Out    | Address bus (A0)  |
| 13      | IO7               | In/Out | Data bus (IO7)  |
| 14      | A1                | Out    | Address bus (A1)  |
| 15      | $\overline{CE}$   | Out    | Chip enable signal for memory devices   |
| 16~18   | A2, A10, A3       | Out    | Address bus (A2, A3, A10)   |
| 19      | $\overline{OE}$   | Out    | Output enable signal for RAM  |
| 20~30   | A4~9, A11~15      | Out    | Address bus (A4~9, A11~A15)   |
| 31      | $\overline{WE}$   | Out    | Write signal output<br>CPU writes data into memory devices when "HIGH"  |
| 32      | $\overline{RFSH}$ | Out    | Refresh signal output<br>CPU refreshes RAM memory data when "HIGH"  |
| 33~39   |                   |        | No function   |
| 40      | GND               |        | +5V source  |
| 41, 42  |                   |        | No function   |
| 43      | VDD1              |        | 0V source   |
| 44~56   |                   |        | No function   |
| 57, 58  | OSI, OSO          | In/Out | 7.277088 MHz clock pulse inputs   |
| 59      |                   |        | No function   |
| 60      | RESET             | In     | Reset signal input<br>Terminal receives "HIGH" level pulse initializing CPU internal circuits at power ON   |
| 61~63   |                   |        | No function   |
| 64      | KO12              | Out    | APO (Auto Power Off) signal output<br>Terminal rises to HIGH level to shut voltages off when the unit is not operated for approximately 7 minutes |
| 65      |                   |        | No function   |
| 66~76   | KO10 ~ KO0        | Out    | Key and switch common signals outputs   |
| 77~84   | KI1 ~ KI8         | In     | Key and switch input signals  |
| 85~88   |                   |        | No function   |
| 89~92   | EH~EE (4~1ch)     | Out    | Melody envelope signals outputs   |
| 93~96   | SH~SE (4~1ch)     | Out    | Melody pitch signals outputs  |

| Pin No. | Terminal Name | In/Out | Function   |
|---------|---------------|--------|--|
| 97      | SC            | Out    | Percussion signal output                         |
| 98      | AGND          |        | +5V source for DAC (Digital to Analog Converter) |
| 99      | VDAC          |        | 0V source for DAC                                |
| 100     | Vin           | In     | Sampling sound signal input from built-in MIC    |

CPU, RAM and ROM control time chart



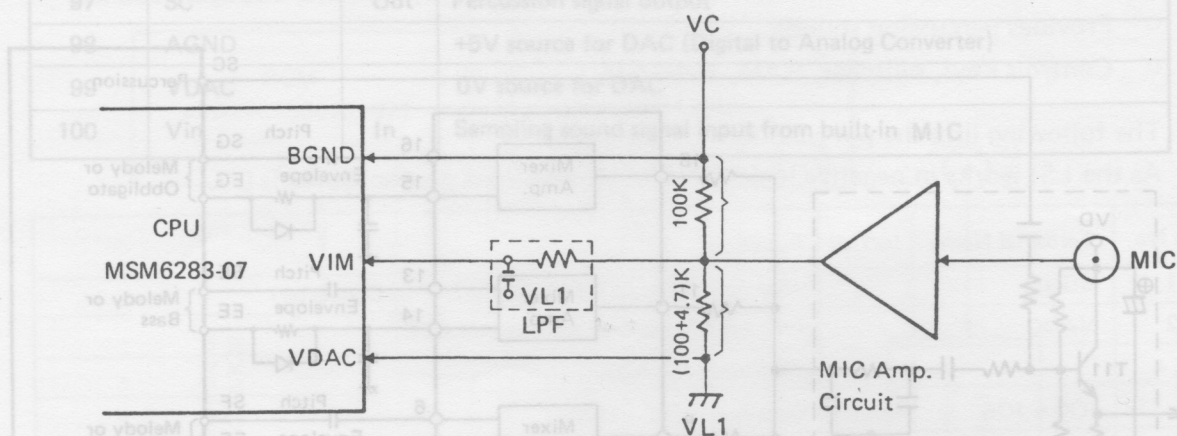




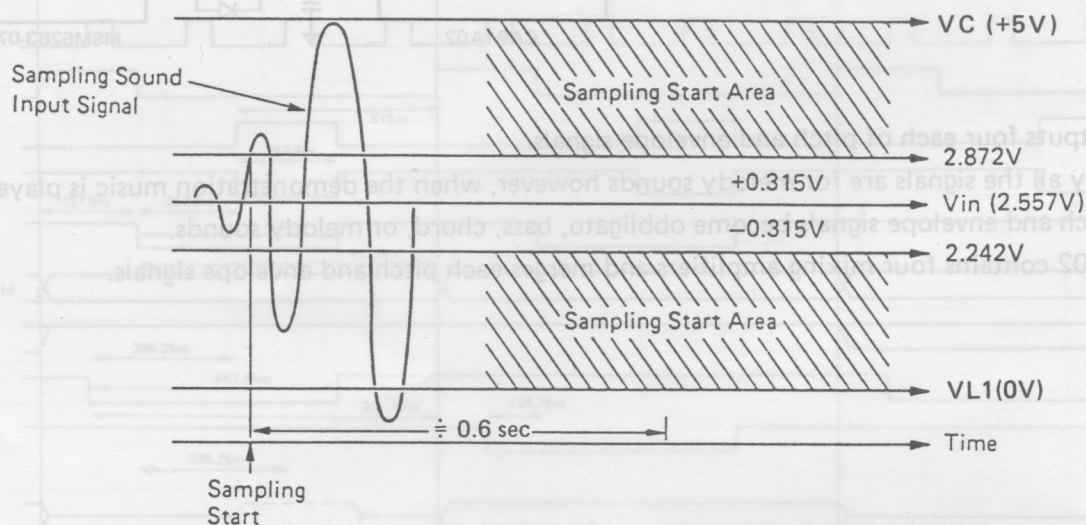
CA91A 02 contains four mixing amplifiers and merges each pitch and envelope signals.



## 7. SAMPLING CIRCUIT



**Fig. 1 Sample Sound Input Circuit**



**Fig. 2 VIM Input Trigger Level**

As shown in Fig. 1, the circuit provides sampling signals to the VIM terminal of the CPU.

Resistors 100Kohm and  $(100 + 4.7)$  Kohm bias the sampling signal on 2.557V.

When the sampling sound level exceeds  $\pm 0.315V$  as shown in Fig. 2, the CPU starts to transmit the sampling sound data to the RAMs.

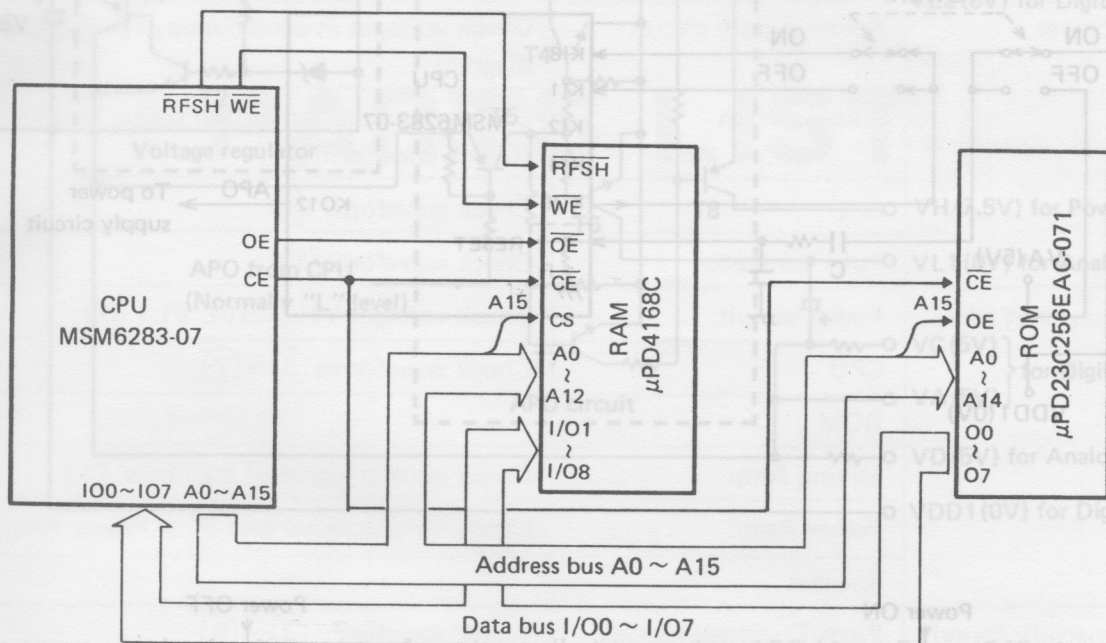
While sampling, the CPU transmits the sampling sound data to the sampling RAMs directly.

While sampling, CPU does not output key common signals (KO0 ~ KO10) so that the keyboard becomes inoperative.

Sampled sounds are digitized in CPU and transmitted to the RAM.



## 8. ROM & RAM ACCESSES



The RAM is 64Kbit dynamic RAM. Since they are dynamic type, data must be refreshed every 2 milliseconds at least. The memory is used as the demonstration, memory play and sampling data area.

The capacity of ROM is 256Kbit and it contains the program for system execution and the preset tone data.

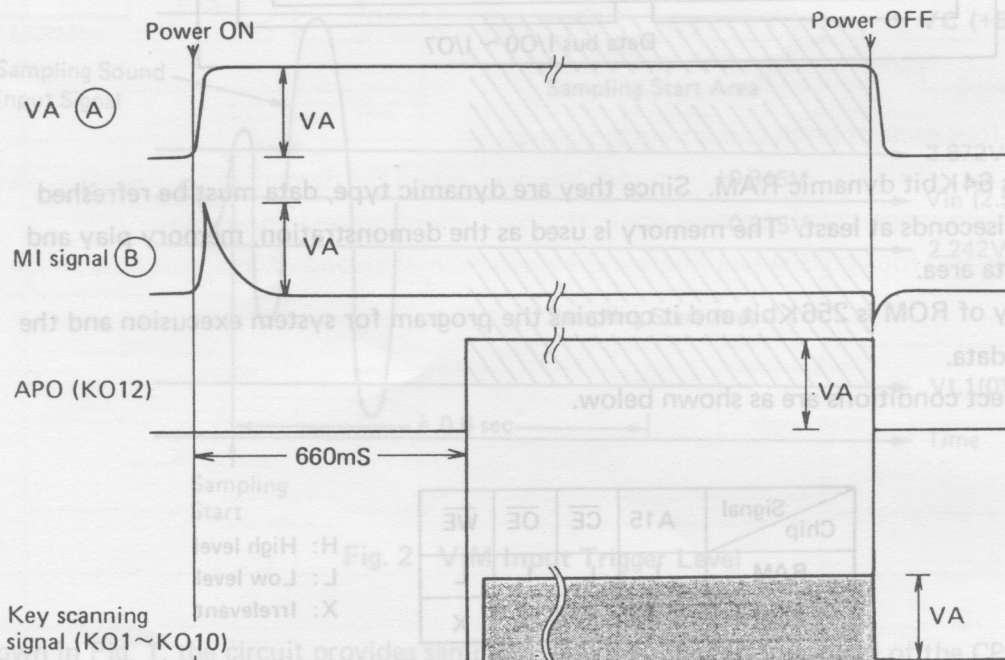
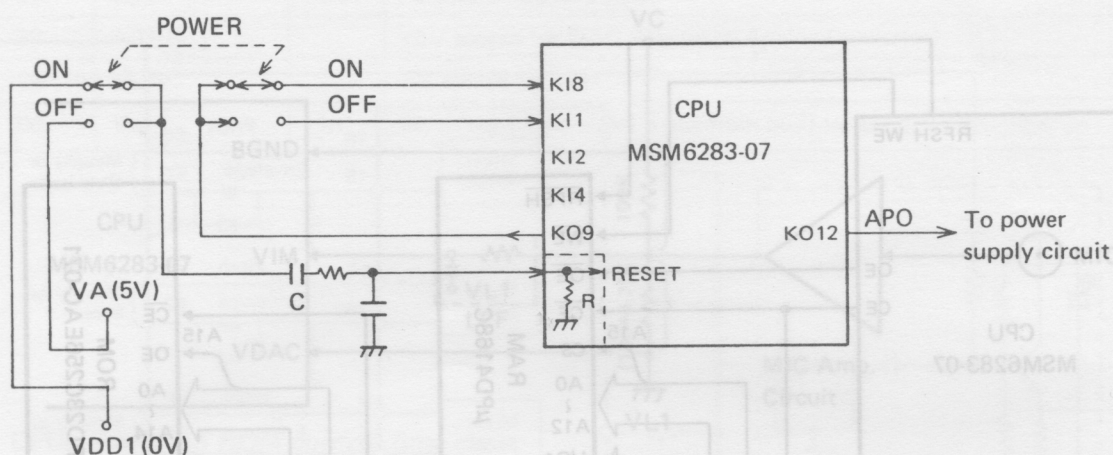
The chip select conditions are as shown below.

| Signal<br>Chip | A15 | $\overline{CE}$ | $\overline{OE}$ | $\overline{WE}$ |
|----------------|-----|-----------------|-----------------|-----------------|
| RAM            | L   | L               | L               | L               |
| ROM            | H   | L               | X               | X               |

H: High level  
L: Low level  
X: Irrelevant



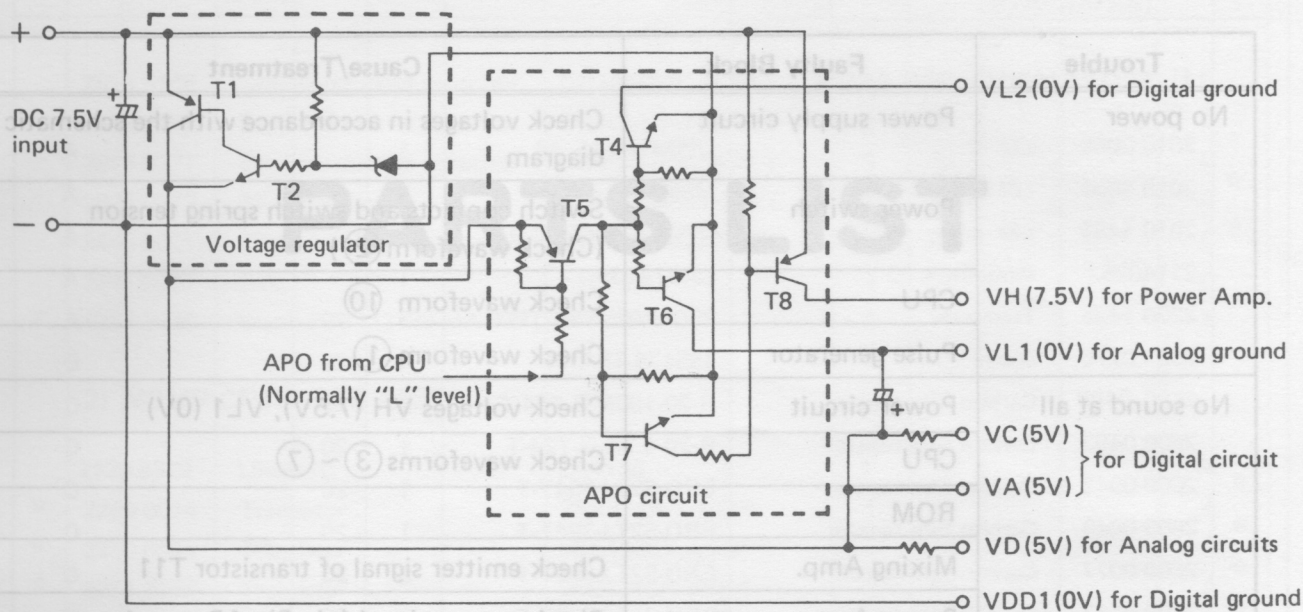
## 9. RESET CIRCUIT



At power ON, the CPU receives RESET signal as shown in the time chart by CR circuit. Then the CPU outputs APO (KO12) and key scanning signals, and starts controlling of peripheral circuits. Also, the CPU detects power switch OFF by receiving key common signal (KO9) in key input terminal (K18) and stops functioning.



## 10. POWER SUPPLY CIRCUIT



The power supply circuit consists of a voltage regulator and an APO (Auto Power Off) circuit.

Transistors T1, T2 and zener diode regulates the battery voltage at five volts.

When power is ON and operation is normal, the APO signal from the CPU maintains Low level.

Transistors T4 ~ T8 turn on providing the voltages to the circuits.

The signal APO becomes HIGH, when the unit is not operated for 7 minutes, transistors T4 ~ T8 turn off causing the voltages except VA (5V) to shut off.

Voltages VA (5V) and VDD (ground) are always provided to the CPU even at APO.

Transistors T1, T2 and zener diode from voltage regulator circuit.



## 11. TROUBLESHOOTING

| Trouble                                       | Faulty Block                  | Cause/Treatment  |
|---|-------------------------------|--|
| No power                                      | Power supply circuit          | Check voltages in accordance with the schematic diagram      |
|   | Power switch                  | Switch contacts and switch spring tension (Check waveform ②) |
|   | CPU                           | Check waveform ⑩   |
|   | Pulse generator               | Check waveform ①   |
| No sound at all                               | Power circuit                 | Check voltages VH (7.5V), VL1 (0V)                           |
|   | CPU                           | Check waveforms ③ ~ ⑦  |
|   | ROM                           |  |
|   | Mixing Amp.                   | Check emitter signal of transistor T11                       |
|   | Power Amp.                    | Check output signal (pin 2) of Power Amp.                    |
|   | Speaker                       |  |
| No melody sound at all (Percussions sound OK) | Pitch/Envelope mixing circuit | Check waveforms ③ ~ ⑥  |
|   | ROM                           |  |
| No rhythm sound at all (Melody sound OK)      | CPU                           | Poor soldering of CPU (Check waveform ⑦)                     |
|   | ROM                           |  |
| Certain keys or switches do not respond       | Dirty contact                 | Clean PCB CN1M and contact rubbers                           |
|   | Poor soldering of diodes      | Resolder diodes  |
|   | Poor contact of PC joiner     | Check poor contact PC joiners                                |
|   | CPU                           | Check poor soldering of CPU                                  |
| Sampling impossible                           | Built-in MIC                  |  |
|   | Sampling circuit              | Check collector signals of transistors T28 and T29           |
|   | CPU                           |  |
|   | RAM                           |  |
| Distorted sound                               | Battery                       | Check the battery voltage                                    |
|   | Speaker                       |  |
|   | Power Amp.                    | Check output signal (pin 2) of Power Amp.                    |
|   | Mixing Amp.                   | Check emitter signal of transistor T11                       |



# PARTS LIST

## EP-30

- Notes:
1. Prices and specifications are subject to change without prior notice.
  2. As for spare parts order and supply, refer to the "GUIDEBOOK for Spare Parts Supply", published separately.
  3. The numbers in item column correspond to the same numbers in drawing.

Note: \* - New parts  
Q'ty - Quantity used per unit  
Minimum order and supply quantity  
C - No stock recommended  
X - No stock recommended  
Rank A: Essential  
B: Stock recommended  
C: Other  
Q'ty: No stock recommended  
Rank: No stock recommended



| Item | Code No.                       | Part Name                 | Specification      | Q'ty | *  | Unit Price<br>N.R. Yen (¥)<br>(FOB: JAPAN) | Rank |
|------|--------------------------------|---------------------------|--------------------|------|----|--|------|
|      | <b>1) M3122-MA1M PCB ASS'Y</b> |                           |                    |      |    |  |      |
|      | 2010 0056                      | LSI                       | UPD4168-15, 16     | 1    |    |  | A    |
| ☆    | 2010 4039                      | LSI                       | MSM6283-07GS       | 1    |    |  | A    |
| ☆    | 2010 4480                      | LSI                       | UPD23C256EAC-071   | 1    |    |  | A    |
|      | 21140252                       | Monolithic IC             | CA91A02            | 1    |    |  | A    |
|      | 2220 1425                      | Transistor                | 2SC1740LNSR-TP-T   | 3    | 10 |  | A    |
|      | 2301 0275                      | Diode                     | 1SS176-TPA7-T      | 4    | 20 |  | C    |
|      | 2606 0483                      | Carbon film resistor      | R-20-100K-G-T24-T  | 2    | 20 |  | C    |
|      | 2606 0483                      | Carbon film resistor      | R-20-4.7K-G-T24-T  | 1    | 20 |  | C    |
| ☆    | 2609 0042                      | Carbon film resistor      | ERD-S2TJ-334T-T    | 1    | 20 |  | C    |
| ☆    | 2609 0049                      | Carbon film resistor      | ERD-S2TJ-394T-T    | 1    | 20 |  | C    |
| ☆    | 2609 0077                      | Carbon film resistor      | ERD-S2TJ-680T-T    | 2    | 20 |  | C    |
| ☆    | 2609 0147                      | Carbon film resistor      | ERD-S1TJ-330T-T    | 1    | 20 |  | C    |
| ☆    | 2616 0332                      | Carbon film resistor      | ERD-S2TJ-101T-T    | 1    | 20 |  | C    |
| ☆    | 2616 0375                      | Carbon film resistor      | ERD-S2TJ-102T-T    | 3    | 20 |  | C    |
| ☆    | 2626 0383                      | Carbon film resistor      | ERD-S2TJ-222T-T    | 5    | 20 |  | C    |
| ☆    | 2616 0405                      | Carbon film resistor      | ERD-S2TJ-392T-T    | 1    | 20 |  | C    |
| ☆    | 2616 0430                      | Carbon film resistor      | ERD-S2TJ-103T-T    | 14   | 20 |  | C    |
| ☆    | 2616 0448                      | Carbon film resistor      | ERD-S2TJ-223T-T    | 1    | 20 |  | C    |
| ☆    | 2616 0472                      | Carbon film resistor      | ERD-S2TJ-563T-T    | 4    | 20 |  | C    |
| ☆    | 2616 0537                      | Carbon film resistor      | ERD-S2TJ-684T-T    | 1    | 20 |  | C    |
| ☆    | 2616 0553                      | Carbon film resistor      | ERD-S2TJ-683T-T    | 5    | 20 |  | C    |
| ☆    | 2616 0596                      | Carbon film resistor      | ERD-S2TJ-221T-T    | 1    | 20 |  | C    |
| ☆    | 2616 0634                      | Carbon film resistor      | ERD-S2TJ-104T-T    | 13   | 20 |  | C    |
| ☆    | 2616 0715                      | Carbon film resistor      | ERD-S2TJ-393T-T    | 2    | 20 |  | C    |
| ☆    | 2616 0723                      | Carbon film resistor      | ERD-S2TJ-474T-T    | 1    | 20 |  | C    |
|      | 2801 7189                      | Electrolytic capacitor    | 50RE2-R33-T14-T    | 4    | 20 |  | C    |
|      | 2804 6037                      | Electrolytic capacitor    | 10RE2-47-T14-T     | 2    | 20 |  | C    |
| ☆    | 2804 6045                      | Electrolytic capacitor    | 6.3RE2-220-T14-T   | 1    | 20 |  | C    |
|      | 2805 3100                      | Electrolytic capacitor    | 16RE2-10-T14-T     | 2    | 10 |  | C    |
|      | 2807 1104                      | Electrolytic capacitor    | 6.3RE2-100-T14-T   | 2    | 20 |  | C    |
|      | 2813 0294                      | Semi-conductive capacitor | RT-C60TKYR223K-T   | 2    | 20 |  | C    |
|      | 2813 0560                      | Semi-conductive capacitor | DD408SR104K16-T    | 8    | 20 |  | C    |
|      | 2813 0644                      | Semi-conductive capacitor | RT-C40TKYR104K16-T | 2    | 20 |  | C    |
|      | 2813 0679                      | Semi-conductive capacitor | DD407SR563K16-T    | 1    | 20 |  | C    |
|      | 2813 0826                      | Ceramic capacitor         | DD003F103Z50-T     | 4    | 10 |  | C    |
|      | 2818 3682                      | Ceramic capacitor         | RT-HE70TKCH820J-T  | 2    | 20 |  | C    |

Note: ☆ — New parts  
Q'ty — Quantity used per unit  
\* — Minimum order and supply quantity

Rank A: Essential  
B: Stock recommended  
C: Others  
X: No stock recommended



| ¥)<br>AN) | Rank | Item | Code No.                | Part Name                 | Specification    | Q'ty | *  | Unit Price<br>N.R. Yen (¥)<br>(FOB: JAPAN) | Rank |
|-----------|------|------|-------------------------|---------------------------|------------------|------|----|--|------|
|           |      |      | 2819 5168               | Semi-conductive capacitor | DD404SR822K25-T  | 1    | 20 |  | C    |
|           |      |      | 2819 5362               | Semi-conductive capacitor | DD406SR473K16-T  | 2    | 20 |  | C    |
| A         |      |      | 2819 5371               | Semi-conductive capacitor | DD404SR682K25-T  | 1    | 20 |  | C    |
| A         |      |      | 2825 0273               | TF capacitor              | ECQ-M1H681KF3-T  | 1    | 20 |  | C    |
| A         |      |      | 2845 0021               | Three porality capacitor  | DS306-56B222M    | 1    | 20 |  | C    |
| A         |      |      | 3841 0007               | Coil                      | L10P-7L          | 1    | 10 |  | C    |
| A         |      | ☆    | 4307 8240               | Blank PCB M3122-MA1M      | M110091-1        | 1    |    |  | X    |
| C         |      |      | 2) M3187-CN1M PCB ASS'Y |                           |                  |      |    |  |      |
| C         |      |      | 2129 8329               | Linear IC                 | LA4138           | 1    |    |  | A    |
| C         |      | ☆    | 2250 0014               | Transistor                | 2SA934R-T-103-T  | 1    | 10 |  | A    |
| C         |      | ☆    | 2250 0091               | Transistor                | 2SA1266Y-AT-T    | 1    | 10 |  | A    |
| C         |      | ☆    | 2251 0168               | Transistor                | 2SB1240R-TV6-T   | 1    | 10 |  | A    |
| C         |      |      | 2252 0084               | Transistor                | 2SC3198Y-AT-T    | 3    | 10 |  | A    |
| C         |      |      | 2253 0217               | Transistor                | 2SD1246T, U-AA-T | 1    | 10 |  | A    |
| C         |      |      | 2301 0275               | Diode                     | 1SS176-TPA7-T    | 41   | 20 |  | C    |
| C         |      |      | 2360 0616               | Zener diode               | HZS6B3LTD-T      | 1    | 20 |  | B    |
| C         |      |      | 2370 0112               | LED                       | LN28RPX-(TT8)    | 1    | 20 |  | B    |
| C         |      |      | 2616 0359               | Carbon film resistor      | ERD-S2TJ-391T-T  | 2    | 20 |  | C    |
| C         |      |      | 2616 0367               | Carbon film resistor      | ERD-S2TJ-561T-T  | 3    | 20 |  | C    |
| C         |      |      | 2616 0375               | Carbon film resistor      | ERD-S2TJ-102T-T  | 4    | 20 |  | C    |
| C         |      |      | 2616 0383               | Carbon film resistor      | ERD-S2TJ-222T-T  | 2    | 20 |  | C    |
| C         |      |      | 2616 0413               | Carbon film resistor      | ERD-S2TJ-472T-T  | 1    | 20 |  | C    |
| C         |      |      | 2616 0430               | Carbon film resistor      | ERD-S2TJ-103T-T  | 1    | 20 |  | C    |
| C         |      |      | 2616 0456               | Carbon film resistor      | ERD-S2TJ-333T-T  | 1    | 20 |  | C    |
| C         |      |      | 2616 0464               | Carbon film resistor      | ERD-S2TJ-473T-T  | 1    | 20 |  | C    |
| C         |      |      | 2616 0472               | Carbon film resistor      | ERD-S2TJ-563T-T  | 1    | 20 |  | C    |
| C         |      |      | 2616 0502               | Carbon film resistor      | ERD-S2TJ-124T-T  | 1    | 20 |  | C    |
| C         |      |      | 2616 0570               | Carbon film resistor      | ERD-S2TJ-123T-T  | 1    | 20 |  | C    |
| C         |      |      | 2616 0626               | Carbon film resistor      | ERD-S2TJ272T-T   | 1    | 20 |  | C    |
| C         |      |      | 2616 0669               | Carbon film resistor      | ERD-S2TJ153T-T   | 1    | 20 |  | C    |
| C         |      |      | 2800 9007               | Electrolytic capacitor    | SME16VB-100(M)-T | 1    | 20 |  | C    |
| C         |      |      | 2801 7469               | Electrolytic capacitor    | ECE-A1CU471ZB-T  | 1    | 10 |  | C    |
| C         |      |      | 2805 3134               | Electrolytic capacitor    | 10RE2-22-T2-T    | 1    | 20 |  | C    |
| C         |      |      | 2805 6559               | Electrolytic capacitor    | SME10VB-220(M)-T | 1    | 20 |  | C    |
| C         |      |      | 2805 6672               | Electrolytic capacitor    | SME10VB-47(M)-T  | 1    | 20 |  | C    |
| C         |      |      | 2805 6699               | Electrolytic capacitor    | SME50VB-1(M)-T   | 1    | 20 |  | C    |
| C         |      |      | 2805 6737               | Electrolytic capacitor    | SME16VB-47(M)-T  | 1    | 20 |  | C    |
| C         |      | ☆    | 2813 0882               | Ceramic capacitor         | DD003B221K50-T   | 1    | 20 |  | C    |
| C         |      | ☆    | 2813 0938               | Ceramic capacitor         | DD003B151K50-T   | 1    | 20 |  | C    |

Note: ☆ — New parts

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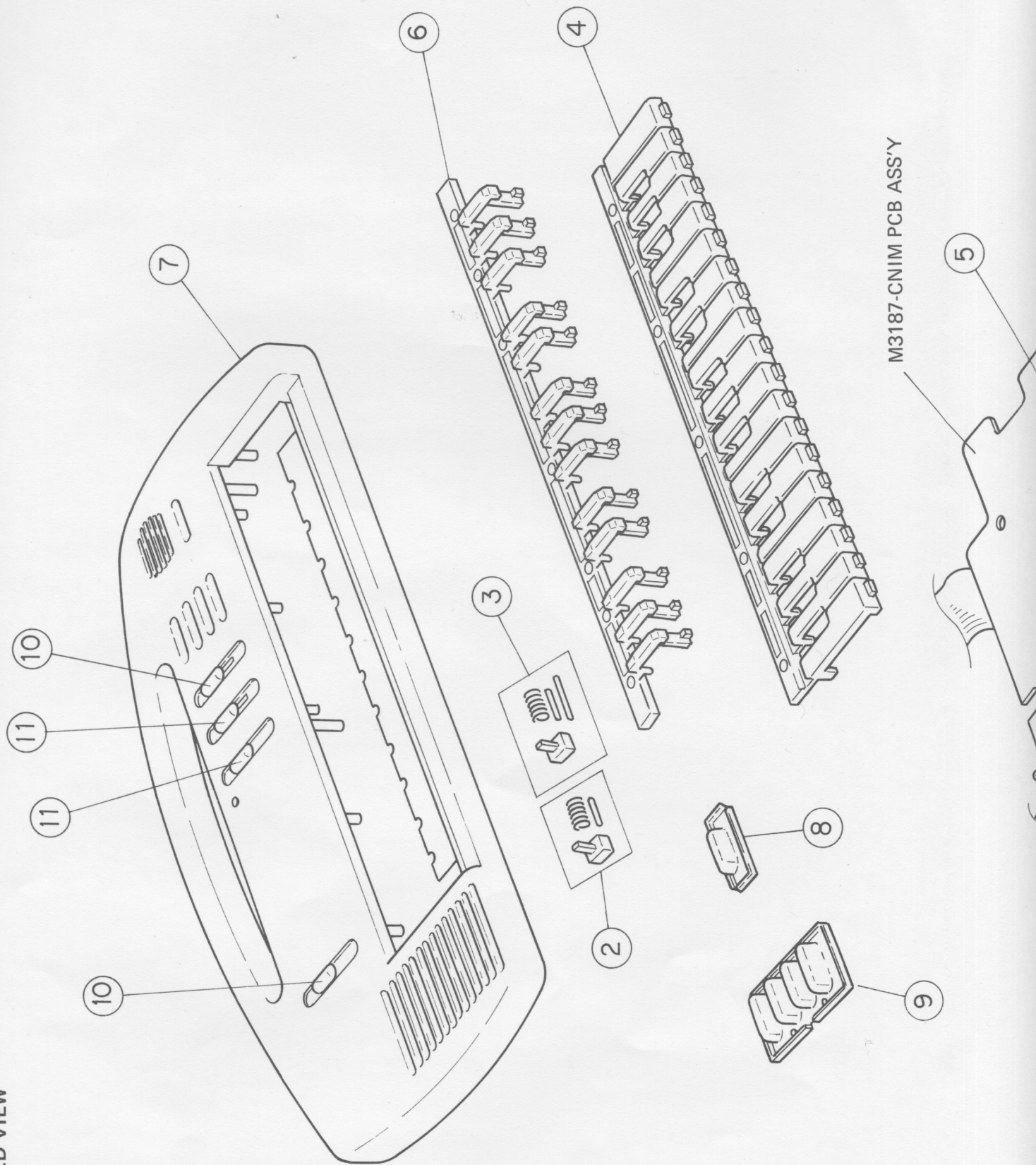
| Item                           | Code No.  | Part Name               | Specification   | Q'ty | *  | Unit Price<br>N.R. Yen (¥)<br>(FOB: JAPAN) | Rank |
|--------------------------------|-----------|-------------------------|-----------------|------|----|--|------|
| ☆                              | 2830 9236 | Mylar capacitor         | NNMTP104K50-T   | 1    | 20 |  | C    |
| ☆                              | 3725 1120 | PC joiner M122A         | JSF00-21-50M    | 1    | 10 |  | C    |
| ☆                              | 4307 8390 | Blank PCB M3187-CN1M    | M110085-1       | 1    |    |  | X    |
| <b>3) M3187-CN3M PCB ASS'Y</b> |           |                         |                 |      |    |  |      |
|                                | 2609 0098 | Carbon film resistor    | ERD-S2TJ-560T-T | 2    | 20 |  | C    |
|                                | 3501 0840 | Jack                    | YKB21-5152      | 1    |    |  | B    |
| ☆                              | 4307 8380 | Blank PCB M3187-CN3M    | M310146-1       | 1    |    |  | X    |
| <b>4) UPPER CASE ASS'Y</b>     |           |                         |                 |      |    |  |      |
| 1                              | 3831 0042 | Speaker                 | KC06573         | 1    |    |  | B    |
| 2                              | 6909 7370 | SL contact 9S           | CSB-09S         | 2    | 20 |  | B    |
| 3                              | 6909 7380 | SL contact 9D           | CSB-09D         | 2    | 20 |  | B    |
| 4                              | 6910 9853 | White key set 2.6       | M2483C-3        | 1    |    |  | C    |
| 5                              | 6910 9961 | Contact rubber M110     | M31255A-1       | 1    |    |  | B    |
| 6                              | 6913 3220 | Black key set 2.6       | M2484-4         | 1    |    |  | C    |
| ☆ 7                            | 6913 7670 | Upper case sub ass'y    | M210103*1       | 1    |    |  | C    |
| ☆ 8                            | 6913 7680 | Rubber button 187A      | M410117-1       | 1    | 10 |  | C    |
| ☆ 9                            | 6913 7690 | Rubber button 187B      | M410118-1       | 1    | 5  |  | C    |
| ☆ 10                           | 6914 4260 | Slide knob 187          | M32712-2        | 2    | 10 |  | C    |
| ☆ 11                           | 6909 9280 | Slide knob 187          | M32712-1        | 1    | 10 |  | C    |
| ☆ 12                           | 6914 4280 | Slide knob 187          | M32712-3        | 1    | 10 |  | C    |
| <b>5) MIC 122 ASS'Y</b>        |           |                         |                 |      |    |  |      |
| 13                             | 3830 9021 | Condensor MIC           | WM-034CY        | 1    |    |  | A    |
| 14                             | 6907 0321 | Sponge 129              | M42612A-1       | 1    | 20 |  | X    |
| <b>6) LOWER CASE ASS'Y</b>     |           |                         |                 |      |    |  |      |
| ☆ 15                           | 6913 7630 | Lower case sub ass'y    | M210104*1       | 1    |    |  | C    |
| ☆ 16                           | 6913 7643 | Battery cover sub ass'y | M31417C*22      | 1    |    |  | C    |
| 17                             | 6345 2238 | Battery spring A-G55    | A42606B-1       | 1    | 10 |  | C    |
| 18                             | 6912 2630 | Battery spring 120      | M42382-1        | 1    |    |  | C    |

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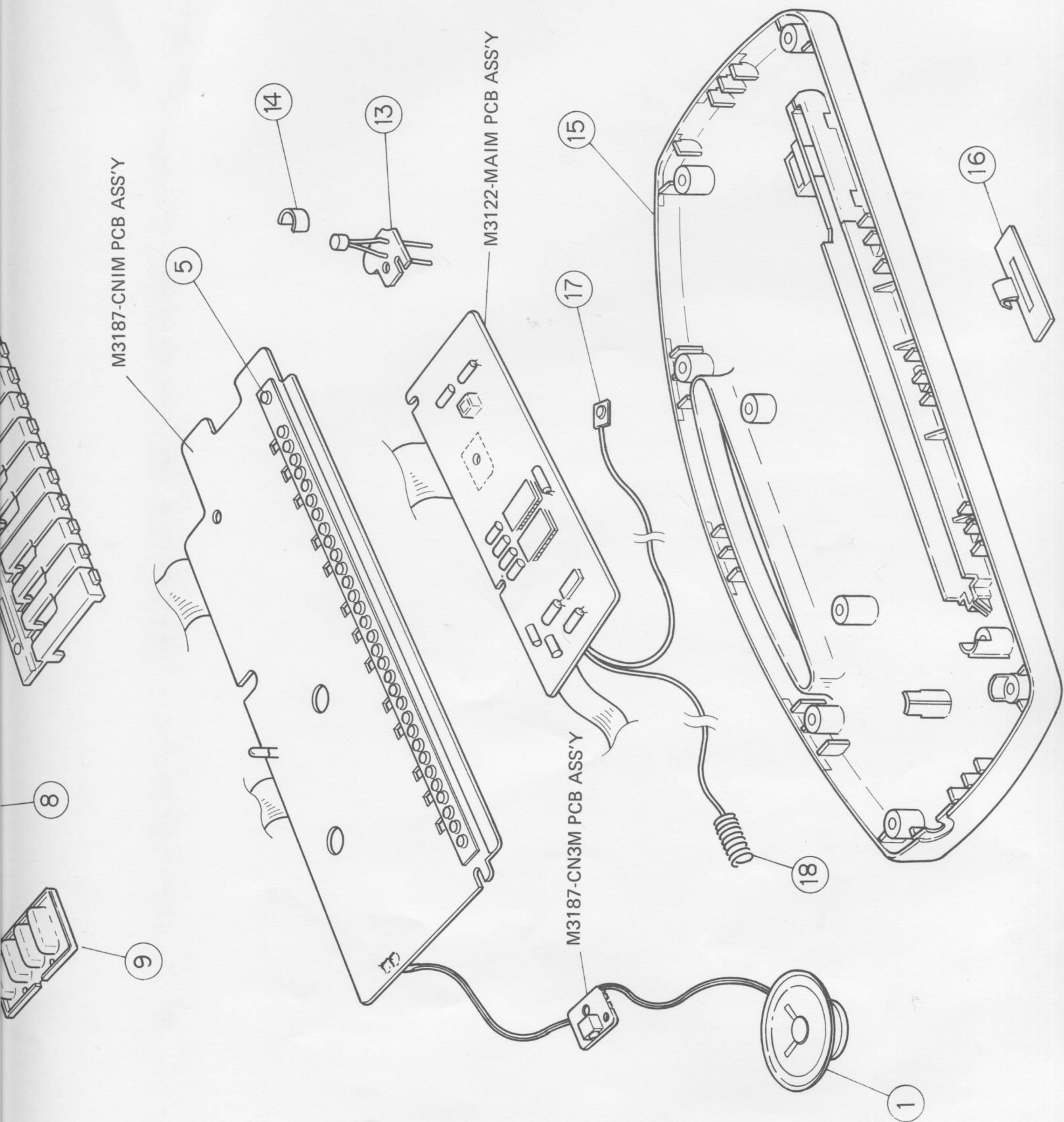
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